objection to extensive use for its caloric value. The money that will buy 30 calories of sherry or 240 calories of beer, will pay for 2180 calories of bread or 3720 calories of oatmeal. There is to be counted too the pleasure of alcoholic beverages. Decision as to how far concomitant dangers should influence the use of alcohol for pleasure, is a matter of personal judgment.

So much for the credit balance. On the debit side is to be placed conclusive scientific data showing the narcotic action of alcohol and its interference with physical health and efficiency, mental health and efficiency, and industrial safety and efficiency. It is yet to be shown that as a rule alcohol as a beverage benefits its users physically, mentally or industrially and economically. It is self-evident that alcohol is not a physiological necessity. Its proved dangers and better understood physiological action make the seriousness of its use largely proportional to the amount used, with the important modification that few drugs have greater tendency to habit formation.

THE PROVOCATIVE WASSERMANN REACTION.

The value of the Wassermann test in *helping* make a diagnosis of syphilis is universally recognized; but the usefulness of the "provocative Wassermann" is not so well known. This latter procedure may be described as follows:

To a patient showing a negative Wassermann but still suspected of having a focus of the spirochetae pallidae in his system, a small intravenous injection (0.3 gramme) of salvarsan or neosalvarsan is given. If the organisms of lues are present, the spirocheticidal action of the drug will cause the liberation of substances which "provoke" the appearance of a positive Wassermann reaction. It is best to examine the blood *twenty-four hours* and again *forty-eight hours* after the injection, for the great majority of positive cases show the reaction within forty-eight hours. Very shortly in most cases the blood will become "negative" again. By this means a doubtful reaction (plus minus) may be converted into a triple or quadruple plus reaction. This test is valuable also in "latent" cases and in *helping* determine whether or not a patient is cured, and it may be of use in early cases where the physician cannot examine material from the ulcer with the dark field condensor. Of course the examination of serum from the sore with the dark field condensor is the most valuable means of making an early diagnosis, but in doubtful cases the "provocative Wassermann" may help.

The subject is fully discussed in the following articles:

Gennerich (Berl. klin. Woch. Sept. 19, 1910, No. 38; Milian (Paris Dermatol. Gessell. Dec. 1, 1910); C. F. Craig (Am. Journ. Med. Sci., 1914. Vol. 149, p. 53), and C. F. Craig (Am. Journ. of Syphilis. Jan., 1917, p. 205).

This procedure has been utilized in the Skin Clinic of the Stanford University Medical School for several years and its value seems established; but it must not be forgotten that in the total absence of any supporting evidence, a single positive Wassermann is not sufficient to make a diagnosis of lues.

Original Articles

A NON-SUTURE OCULAR TENDON SHORTENING WITH RESULTS OF FORTY OPERATIONS.*

By RODERIC O'CONNOR, M. D., Oakland, Cal.

At first thought one is apt to jump to the conclusion that, like the countryman looking at a giraffe for the first time, "there ain't no sich thing" possible. However, the thing is so simple the wonder is that it was not thought of long ago.

The idea came to me one day, when I was shortening a saddle girth, that an ocular tendon could be shortened in exactly the same way by dividing it into several bands. *In this way a safe, and certain shortening, can be secured, without the constriction and cutting, that is a necessary part of every suture method.* It then becomes merely a question of sufficient experience upon which to base an estimate of the amount of shortening needed in any given case. This because a definite shortening of the inelastic tendon does not mean the same in the total muscle, due to the elasticity of the muscle tissue.

By using this principle the need for tenotomy is reduced to an absolute minimum. In this connection you will probably agree that tenotomy has been looked upon as a necessary evil, and done with few exceptions, only because of the uncertain results from advancements—at least in the hands of the average operator.

Figure 1 (a) shows the course of the rope in shortening all the strands of the girth; (b) shows the looping of the strands about the rope after it has been straightened. It is clear that the rope takes the constriction and therefore the shortening is permanent. I have used saddle girths, so shortened, for years. There can be, in my opinion, no argument against the principle. However, the possibility of the tendon bands straightening with loss in effect upon absorption of the catgut used as the shortener was considered and therefore I have never used this method.

I then began to figure on means to shorten, in a similar manner, a band on each margin of the tendon, wide enough to take the full action of the muscle, this shortening to relieve an advancement, tuck, or resection, of the remaining central portion, from all tension during the healing period. In this way, by the time the catgut is absorbed, the central tongue is firmly healed in position and able to take the muscle action. This, therefore, is the method I have used in all but two of my operations.

Figure 1 (c and d) show the first and second stages in the passing of the shortener; (e) shows the marginal bands shortened, and the evident re-

* Read before the annual meeting of the California State Medical Society, Fresno, Cal., April 20th, 1916.

laxation of the central portion (f) which can be taken up the amount of its looseness and the means employed be under no tension. Inasmuch as a double loop is formed in this method, the shortening is far greater than in the first method.

My chief desire in working up this method is to avoid tenotomies especially of the interni and the results as shown in the following summary speak for themselves.

RESULTS.

Shortenings of externi for concomitant esotropia and esophoria in degrees varying from 7 prism to 60 of arc—24. In all but one of these the result desired was secured and *no* tenotomies of the interni done. The exception was on the second externus of the 60 degree case, and in this the tendon was shortened in three bands instead of suturing the central tongue forward. I had gotten about 35 degrees of effect from the first operation, which the second did not appreciably increase. This, therefore, is not my typical method. One case later developed a gonococcus infection and the final result was a failure.

Shortenings of externi for paresis of that muscle—2. Cosmetic and functional results were secured in both cases without tenotomy of interni.

Shortening of paretic interni to correct exotropia due to the paresis—3. In all of these tenotomies were needed to aid the shortening of the weak muscle. In two perfect results were secured. The other was a case of 70 degrees exotropia due to 3rd nerve paralysis of 25 years standing. She simply wished to "get the eye somewhere around to the front" and we got 53 degrees of the total which was the best possible I believe.

Shortenings of interni to correct concomitant exotropia in degrees varying from 9 to 55 degrees of arc—6. In five of these full results were obtained without tenotomy; in the other, the outer two-thirds of the upper and lower recti were cut increasing by 5 prism degrees, the effect produced by the shortening which was insufficient due to error of judgment—only 8 prism degrees being secured.

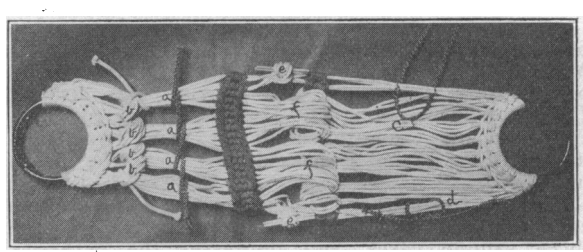
Shortenings of interni to correct insufficiency of convergence—3. Two of these were on the same man and increased his convergence from 5 to 26 meter angles. In spite of this tremendous increase an exophoria of 7 prism degrees was reduced only to 4. An externus was partially cut by my multiple incision method and orthophoria secured. The other case had normal balance for distance, but 14 of exophoria for near, and but 6 meter angles of convergence, which was increased to 11 by the operation. The headaches he used to have after near work have ceased.

Shortening of a superior rectus to correct a paresis of 30 years standing—1. Before operation the woman could fuse images only in the extreme lower limit of rotation, whereas, afterwards she could fuse to a point 10 degrees above the horizontal—measured on the perimeter.

This case was checked up six months later and found to have been corrected 10°. The remaining 9° was secured by partial tenotomies and she now has vertical orthophoria. This later information operates to remove the case from the list of failure to that of success.

Shortening of an inferior rectus for a 19 prism degree concomitant hyperphoria. Through fear of doing too much too small a catgut was used and an inappreciable effect was secured. This, therefore, is the only absolute failure in my *typical method* and was due to error of judgment. The other failure was the one where the tendon was shortened in three bands.

One of the greatest advantages of this operation is, that squint cases may be operated on at any age, consequently, in young children it may be done, allowing the faculty of binocular stereoscopic vision to be developed in a normal way, and amblyopia exanopsia be prevented without the necessity for monocular patches, or the use of atropin in the good eye. There is no more reason to suppose that a pair of eyes straightened by an operation such as this will not remain so (as well as eyes that are naturally straight to begin with) during the course of head development. My last two operations were in children three years of age, and the immediate results were excellent. They are too recent to include in the statistics. When it is remembered that these represent my first 40 consecutive operations; that the method is still in its developmental stage as regards the estimation of amount of shortening needed in any case; that no tenotomies of the interni have been done; that no binocular bandaging has been used; that in all cases the patients were permitted to go about their usual occupations, many even without a monocular bandage, I think you will agree with me that the results are, to say the least, unusual.



A non-suture ocular.

Figure 1.—(a) Course of rope loops about strands of girth; (b) loops thrown about shortening rope by straightening it; (c) loop of shortening rope under a marginal band; (d) ends drawn through forming a double half hitch; (e) double half hitch transferred to marginal bands by straightening the shortening rope; (f) doubling and relaxation of the central section of the girth.

With an operation as certain and safe as this, I am able to follow an advice of Dr. Valk who says "with an operation that is perfectly safe and simple do not let the words 'operate as a last resort' influence you in any way. Decide from your examination that an operation is necessary and you may be confident of success." By this he means functional as well as cosmetic success.

Therefore I can see no reason for allowing so many cases to suffer for years from headaches and other reflex symptoms of eyestrain when the cause can be so easily and safely removed.

The present handling of muscle cases by the

average oculist is much like the older methods of handling intra-nasal cases—that is, largely temporizing in character. Nowadays intra-nasal work is practically entirely operative. Extra-ocular muscle work, will before long reach the same position and the hope of permanently altering anatomical defects by prisms, exercises, and other temporizing measures, will be given up.

A detailed description of the technic has been omitted, as taking up too much time, and I would refer any who may be interested, to my article in the *Ophthalmic Record* of December, 1914, as I have only made a couple of minor changes since that date.

Discussion.

Thos. J. McCoy, M. D.: I received Dr. Hulen's paper just a few days before coming to Fresno and have jotted down a few ideas I wish to offer in discussion of the same.

I congratulate ourselves on the excellent paper contributed by Dr. Hulen, covering so much of the subject in the brief time allotted him, again reminding us of the most modern and approved methods of treating this disease mechanically, and surgically, and describing his procedure in tucking the tendon which appeals to me more than the others I have witnessed. I am in hearty accord with him in the earliest attention for the development of fusion, binocular vision, and correction of strabismus for the attempted relief of amblyopia.

Thanks to the long and earnest efforts of Priestly Smith, Claud Worth and others, for their invaluable findings in establishing facts and methods, that we may prescribe relief. Few men have the opportunity, in abundance of material, the enthusiasm, and earnestness in specializing on this line of investigation as my instructor, Claud Worth of London. His ability and painstaking methods soon became recognized by his colleagues and he was favored by their referring cases to him in the Royal London Ophthalmic, the West Ham, East London and Loughborough Hospitals.

Think of notes on 2337 squint and heterophopias. Of these 1729 convergent squints along to May, 1906. After proofs by their investigations on the benefit of early attention in this disease, I am not surprised at Dr. Hulen taking issue with the gentlemen mentioned in his paper for waiting until the period is passed, to benefit the vision in these cases.

The paper described comprehensively the different findings, and methods of handling each of the three sample cases, and impresses the necessity of careful and early treatment in each. Unfortunately for the lack of training, and knowledge of fusion, binocular vision, and other causes of amblyopia and the early relief of the same by the family physician, who first sees these cases, it is late and many times too late for their relief. He should be a walking encyclopedia of medical information, both general and special for us, willing to assume all responsibilities for the patient as specialists in general, referring all cases, though it greatly depletes his income, even to starvation of himself and family; further, willing to assume the blames all, the errors all, of the profession and mankind in general in the beginning as in the dim declining years of life with a satisfied and sublime hope of his reward in Heaven.

The cardinal symptoms generally found more or less in every case of convergent strabismus are abnormal convergence, the imperfect development of the power of fusion, the visual sensation of the crossed eye is suppressed, the vision is subnormal and the eyes are hyperopia with or without astigmatism. Only very great anomalies of position furnish direct cause. It has been proven that amblyopia is not the cause, but the result of strabismus. If we consider a defect in the power of fusion to be the most important cause of strabismus, we can account why the error of refraction besides hyperopia is an exciting factor. Anisometropia is a predisposing cause and deviations may arise after excitement, fevers or convulsions. As one of the proofs of the absence of fusion, the cause of strabismus is a fact, that excellent cosmetic results have been obtained from operations, and yet the patient has no binocular singular vision. They may see double and cannot fuse the image although close. An imperfect power of fusion producing strabismus convergence. An abnormal inneration may develop, nervous factors, etc., and more is the urgent demand for the early relief as advocated in the paper. As the doctor has said there are cases, that after careful examinations, we find the only relief is by operation without delay, as an attempt to improve the vision as cosmetically.

The result of advancement after the methods of Worth and Reese have been so satisfactory in my experience, at times with some modification. I have never attempted the tucking method. However, the simplicity of the method appeals to me.

P. A. Jordan, M. D.: I have never had any experience with Dr. O'Connor's operation but it appears to me to be very simple and I am going to try it.

Regarding Dr. Hulen's operation of 1910, I have had some experience with it and always with the greatest satisfaction. I was much pleased when Dr. Hulen said to operate early. My belief is that from six to eight years is often too late. I have been chagrined, at times, to have patients of six, eight, ten or twelve years of age presented to me with the advice from the family physician, that they had been held aloof from an operation, thinking that an early operation would tend to an over-correction later on. I would suggest very early operation when treatment and correction fail. And readjust an over-correction in later years if need be.

I had one experience recently which I shall not soon forget. I was doing the Dr. Harry Woodruff operation of tendon tucking, and in order to make the sutures pass through more easily, I passed the 20 day chromocized catgut through vaselin. I recovered the sutures at the end of twenty days through an abscess, they not having absorbed at all. The abcess healed, but the squint is about the same as it was in the beginning. I think I shall try Dr. Hulen's new method more often than heretofore.
